BESS Technology, Safety, and Community Impact Briefing

A Comprehensive Reference for Communities Facing Battery Energy Storage Proposals

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Risk Category Indicators

■**MFG** Manufacturing Defect / Quality Control ■**DES** Design / Integration Failure
■**BMS** Controls / BMS Failure ■**OPS** Operational Failure / Human Error
■**ENV** Environmental Factor (water, heat, weather) ■**CYB** Cybersecurity Vulnerability
■**SUP** Suppression / Safety System Failure

Risk indicators appear throughout this document next to paragraphs describing failure events, vulnerabilities, or conditions that fall into one or more risk categories. Multiple indicators on a single paragraph denote compound risk.

Part 1: What Is a BESS?

A Battery Energy Storage System (BESS) is a large-scale installation of lithium-ion batteries designed to store electricity generated from renewable sources and discharge it to the grid during peak demand. A utility-scale BESS consists of hundreds of containerized battery modules, power conversion systems (inverters), transformers, cooling infrastructure, fire suppression equipment, and supervisory control systems spread across dozens or hundreds of acres.

The technology is real, and the grid genuinely needs storage capacity. Nobody disputes that. What communities dispute is where these facilities get built, how they get approved, who benefits, who bears the risk, and what happens when something goes wrong.

The Project at Issue

The facility referenced in this brief is a NextEra Energy Resources BESS proposed on 120+ acres of land currently zoned agricultural, with approximately 190 battery modules and a rated capacity of approximately 200 megawatts (MW). To put the scale in perspective: 120 acres is roughly the size of 90 football fields. NextEra Energy, headquartered in Juno Beach, Florida, is one of the largest energy companies in the world, with revenue exceeding $24 billion in 2024.

Part 2: Battery Chemistry — Understanding the Technology

NMC (Nickel Manganese Cobalt)

NMC batteries use a cathode made of nickel, manganese, and cobalt. They offer high energy density, meaning more energy stored per unit of weight and volume. NMC was the dominant chemistry in early grid-scale BESS installations, including the Moss Landing facility in California that experienced the catastrophic January 2025 fire. NMC batteries are more susceptible to thermal runaway, with cathode decomposition beginning at temperatures around 200°C, at which point oxygen molecules may be released, reacting with the flammable electrolyte and causing rapid, intense combustion. When NMC batteries burn, they release toxic metals including nickel, cobalt, and manganese into the environment.

LFP (Lithium Iron Phosphate) — The "Iron-Based" Battery

LFP batteries use a cathode made of lithium iron phosphate. The industry has been shifting to LFP for grid-scale storage, and developers now market these as "iron-based" systems to make them sound benign — like iron, the stuff in your garden soil. LFP batteries are more thermally stable than NMC, with phosphate bonds of approximately 460–490 kJ/mol that resist structural failure. LFP cathode decomposition does not begin until 700–800°C, and the material does not release oxygen during failure, which significantly reduces the intensity of combustion. LFP batteries are also cobalt-free and nickel-free, lowering the toxic metal risk in the event of a fire. They have longer cycle lives (2,000–5,000+ cycles vs. 1,000–2,000 for NMC) and lower costs per kilowatt-hour.

The "Safer" Claim Needs Context

LFP is harder to set off than NMC. That much is true. But "safer" is not "safe." LFP batteries still contain a flammable organic electrolyte. They still require active cooling systems that can fail. And when they do fail, the results are not as benign as the industry suggests.

A 2024 peer-reviewed meta-analysis by researchers from the University of Sheffield, Imperial College London, and the University of St Andrews examined off-gas characteristics from 60 published studies. They found that while NMC batteries release more gas during thermal runaway, LFP batteries produce off-gas with significantly higher hydrogen content. Hydrogen is extremely flammable. The researchers calculated that LFP off-gas breaches the lower flammability limit (LFL) in a volume 18% smaller than NMC — meaning in an enclosed container, LFP off-gas reaches explosive concentration faster than NMC off-gas. The study concluded that "LFP presents a greater flammability hazard even though they show less occurrence of flames in cell thermal runaway tests."

In plain English: LFP is harder to ignite, but if it does go, the gas it produces is more flammable and reaches explosive concentration faster than the chemistry it replaced. Both chemistries use flammable liquid electrolytes. Both can undergo thermal runaway. Both produce toxic and flammable off-gases including hydrogen, hydrogen fluoride, carbon monoxide, methane, and ethylene.

Iron-Air Batteries (Form Energy)

A separate technology entirely, iron-air batteries store energy through “reversible rusting” — iron oxidizes during discharge and deoxidizes during charging. Developed by Form Energy, these systems use iron, water, and air as their active ingredients and claim 100-hour storage duration. However, iron-air technology is still in the pilot stage. Form Energy’s first commercial pilot (1.5 MW in Minnesota) was expected to begin operation by late 2025. There is no evidence that NextEra is deploying iron-air technology. If NextEra is telling your community their system is “iron-based,” they are almost certainly referring to LFP lithium-ion batteries — not iron-air.

Chemistry Comparison at a Glance

Characteristic	NMC	LFP	Iron-Air
Cathode Material	Nickel, Manganese, Cobalt	Lithium Iron Phosphate	Iron (reversible rust)
Thermal Runaway Onset	~200°C	~270°C (cathode stable to 700°C+)	Not applicable (non-flammable)
Releases Oxygen in Failure	Yes	No	No
Flammable Electrolyte	Yes (organic liquid)	Yes (organic liquid)	No (water-based)
Off-Gas Toxicity	High (HF, CO, metals)	High (more H_2 content)	Minimal
Cycle Life	1,000–2,000 cycles	2,000–5,000+ cycles	Unknown (pilot stage)
Toxic Metals in Fire Debris	Nickel, Cobalt, Manganese	Iron, Phosphate (lower risk)	Iron (low risk)
Commercial Maturity	Mature (declining use)	Mature (industry standard)	Pilot stage only

Part 3: Fire Risk — Thermal Runaway Explained

Thermal runaway is a self-sustaining chain reaction in which a damaged or overheated battery cell releases flammable and toxic gases, generating extreme heat that spreads to adjacent cells. Once thermal runaway begins in a lithium-ion battery, it is self-sustaining: the battery generates its own heat, and in NMC chemistry, its own oxygen. Traditional firefighting methods are often ineffective.

BESS fires can burn for days. Fire departments are often instructed to establish a perimeter and let the fire burn itself out — a “controlled burn” approach that exposes surrounding communities to prolonged smoke and toxic emissions. The IAFF has warned that the timing and severity of battery gas explosions during thermal runaway are unpredictable. FEMA has acknowledged that BESS fires represent an emerging hazard that most local fire departments are not trained or equipped to handle.

■BMS ■DES ■OPS ■ENV ■MFG Key triggers include: overcharging, internal cell defects, manufacturing flaws, cooling system failures, water intrusion into containers, physical damage, extreme heat, and software/control system errors. A 2024 joint study by EPRI, Pacific Northwest National Laboratory, and TWAICE found that 65% of BESS failure incidents could be linked to operational and integration factors — not failures of the battery cells themselves. Faulty humidity control, poorly sealed enclosures, rain penetration, and commissioning errors were significant contributing causes. Only 11% were caused by failures of battery cells or modules.

Part 4: Documented BESS Fire Incidents

The following is a selected list of significant BESS fire and failure incidents. The EPRI BESS Failure Incident Database is the most comprehensive public source, documenting 81+ incidents globally through 2024. However, EPRI's database relies on public media reporting and is acknowledged to be incomplete. There is no federal, state, or local requirement in the United States for mandatory BESS incident reporting.

Date	Location	Owner/Operator	Chemistry	Outcome / Risk Categories
Apr 2019	Surprise, AZ	APS / Fluence / LG Chem	NMC	■MFG ■DES ■SUP Explosion. 4 firefighters seriously injured (TBI, broken bones, burns). Captain thrown 70+ feet. Internal cell defect triggered thermal runaway. Inadequate thermal barriers between cells. Fire suppression ineffective. No ventilation for off-gas. Facility destroyed.
2017–2019	Multiple, South Korea	Various	NMC / LFP	■OPS ■BMS ■DES 23+ fire incidents. SOC above recommended limits in many cases. Design and integration defects. Fires occurred with both NMC and LFP chemistries. Government shut down units.
Jul 2021	Victoria, Australia	Tesla Megapack / Neoen	NMC	■MFG ■DES 2 Megapacks burned during commissioning. Cooling system leak caused arcing between modules. Wind carried flames to adjacent unit. Design failed to isolate units.
Sep 2022	Moss Landing, CA	Vistra / PG&E	NMC	■BMS Tesla Megapack fire. Highway 1 closed. No injuries. Facility partially offline. Root cause under investigation.
May 2023	East Hampton, NY	NextEra / National Grid	Li-ion	■BMS ■DES NextEra's 5 MW BESS caught fire. Roads closed, LIRR trains halted. Suppression "operated as designed" but facility offline ~1 year. Required substantial rebuild. Root cause not publicly disclosed.
Jun 2023	Warwick, NY	Convergent / Powin	Li-ion	■ENV ■DES Fire alarms at 2 of 4 units. One caught fire next day. Rainwater intrusion into containers cited as contributing factor. Enclosure sealing failure.
Jul 2023	Chaumont, NY	Convergent	Li-ion	■SUP Battery at solar farm burned for 4 straight days. Suppression could not stop propagation.

				Governor Hochul created interagency fire safety working group.
Sep 2023	Valley Center, CA	Terra-Gen	NMC	■BMS 139 MW facility. Homes within 1/4 mile evacuated. Shelter-in-place for 1/2 mile radius.
May 2024	Otay Mesa, CA	LS Power	Li-ion	■BMS ■SUP 250 MW Gateway facility. Fire burned 22+ hours. 600-foot safety barrier. Dangerous hydrogen levels. Batteries reignited on successive nights. Donovan State Prison sheltered in place. Fire active until May 31.
Jan 2025	Moss Landing, CA	Vistra	NMC	■DES ■SUP ■BMS World's largest BESS. 300 MW. Fire suppression failed in at least one rack. Indoor design trapped heat. Moisture from suppression system caused short circuits. 55,000 lbs toxic metals. 1,500+ evacuated. Reignited Feb 18.
Dec 2025	Warwick, NY	Convergent	Li-ion	■ENV ■DES Same community's THIRD fire incident. Single container. Multi-agency response. Ongoing enclosure integrity concerns.

Note: This table is not exhaustive. South Korea alone experienced 23+ incidents between 2017 and 2019, and global incidents continue to occur. The EPRI database documented 81+ incidents through 2024. Industry claims that the failure rate has dropped 97–98% since 2018 are based on incidents per cumulative GW deployed — a metric that has been challenged by independent analysts as misleading because it counts all previously deployed capacity in the denominator, including facilities that have not yet aged enough to fail.

Part 5: NextEra Energy — Corporate Profile and Track Record

NextEra Energy, Inc. (NYSE: NEE) is headquartered in Juno Beach, Florida and is one of the world's largest renewable energy companies, with revenue exceeding $24 billion in 2024. Its subsidiary NextEra Energy Resources (NEER) develops and operates wind, solar, and battery storage projects nationwide. NextEra has faced community opposition, lawsuits, and documented safety incidents across multiple states.

East Hampton, NY (May 2023): NextEra's 5 MW BESS caught fire. Roads closed. LIRR Montauk branch halted. Facility offline for approximately one year. NextEra called it "an isolated incident" and said suppression systems "operated as designed" — yet the facility required a complete rebuild.

Sumner County, KS (Dec 2025): County commission rejected NextEra's proposed BESS. Over 1,000 petition signatures gathered — more than half the votes cast in the prior election. Residents cited fire risk, water contamination, and emergency response concerns.

Garfield County, OK (2025): 31 farmers and landowners sued NextEra over the Skeleton Creek Energy Center (~2,000 acres), alleging the company secured approval without complying with required zoning regulations and deliberately avoided filing for a zoning change to sidestep public opposition.

Greene County, NC (Jan 2025): NextEra's Muscov Energy Center (52 MW BESS / 130 MW solar) deferred after the development team could not answer a basic question at a public hearing: what happens if the BESS catches fire? A local firefighter had to answer.

Solano County, CA (2025): NextEra took its 300 MW Corby Project to the California Energy Commission to override a local moratorium on battery storage, citing state preemption legislation. Residents described the move as corporate overreach.

Platte County, WY (Jul 2025): Standing-room-only crowd opposed NextEra's Chugwater Wind, Solar, and BESS project. Residents described NextEra's lack of transparency. One attendee stated: "They haven't even told us what kind of batteries they'll use." Wyoming Secretary of State and state lawmakers attended in opposition.

Corporate Legal History: A lawsuit filed in U.S. District Court in Massachusetts alleged NextEra used a "scorched-earth scheme" to block competition and caused $350+ million in damages. In Florida, NextEra's parent company (Florida Power & Light) was implicated in placing "ghost candidates" on ballots in three contested 2020 election districts.

Part 6: Environmental and Agricultural Concerns

Beyond fire, BESS installations on agricultural land raise multiple environmental issues: conversion of productive farmland to industrial use; potential contamination of soil and groundwater from electrolyte leakage; stormwater runoff carrying heavy metals and industrial chemicals; constant noise from cooling systems and inverters; visual blight and viewshed destruction; and habitat loss.

The Moss Landing research demonstrated that toxic metals from a BESS fire enter the food chain through bioaccumulation — settling in marsh soils, taken up by invertebrates, eaten by fish, and concentrated in top predators. Researchers found nickel-to-cobalt ratios matching NMC cathode materials in the surface soil. For agricultural communities, the implications include: soil contamination, livestock exposure through grazing and water, potential loss of organic certification for nearby farms, and long-term monitoring obligations that may fall to the community rather than the developer.

Part 7: Vertical Integration and the Subsidy Structure

One of the least discussed aspects of large-scale BESS development is vertical integration. Companies like NextEra operate across the entire energy value chain — generation (wind/solar), transmission (power lines), storage (BESS), and in some cases the end-use facilities (data centers). Each link may be held by a different subsidiary or LLC, creating the appearance of competition where none exists.

These projects are heavily subsidized through federal Investment Tax Credits (ITC), Production Tax Credits (PTC), and Renewable Energy Credits (RECs). The developer collects the credits, sells stored power back to a utility it may control or have a long-term purchase agreement with, and the host community bears the land-use burden, environmental risk, and emergency response costs. The tax revenue promised to local governments is often modest compared to the loss of agricultural productivity, strain on infrastructure, and long-term liability if something goes wrong.

Part 8: Who Really Owns This? Corporate Ownership, Chain of Incentives, and Regulatory Capture

The question of who benefits from a BESS project in your county cannot be answered by looking at the developer alone. NextEra Energy is one node in a much larger financial network. To understand who is profiting, who is influencing the rules, and who is bearing the risk, you have to trace the ownership upward, the incentives sideways, and the political influence downward.

The Same Shareholders Own Everything

NextEra Energy (NYSE: NEE) is approximately 80% institutionally owned. The three largest shareholders are Vanguard Group (~10.3%), BlackRock, Inc. (~5.4–7.3%), and State Street Global Advisors (~5.1–5.7%). Together, these three firms control roughly 20–23% of NextEra's outstanding shares with voting power over board composition, executive compensation, and strategic direction. Insiders own less than 1%.

Now look at IDACORP, Inc. (NYSE: IDA), the parent company of Idaho Power. IDACORP is 98.88% institutionally owned. Its largest shareholder is BlackRock, Inc., owning approximately 12.05% (6.51 million shares, ~$810 million). Vanguard is the second-largest holder. The same institutional investors that own the developer proposing to build a BESS in your county also own the utility that will purchase the stored power. They sit on both sides of the transaction.

This is not coincidence. BlackRock and Vanguard are among the three largest institutional investors in 505 out of 505 S&P 500 companies. One or the other is the single largest institutional investor in 84% of those companies. Academic research has found that these firms coordinate voting through centralized corporate governance departments, functioning as de facto owners.

The Vertical Stack: Generation, Transmission, Storage, and Consumption

BlackRock and its affiliates now hold significant positions across the entire energy infrastructure stack. In generation, BlackRock holds major positions in NextEra, Duke Energy, and Southern Company. In transmission, those same utilities own the lines that carry the power. Idaho Power owns and operates southern Idaho's transmission system. In storage, NextEra is one of the largest BESS developers in the country, and BlackRock's subsidiary Global Infrastructure Partners (GIP) owns Jupiter Power, another major BESS developer. In Oregon, BlackRock's affiliated funds control Jupiter Power while simultaneously holding equity positions in Portland General Electric, the utility Jupiter Power's BESS connects to.

In consumption, BlackRock's GIP acquired Aligned Data Centers, one of North America's fastest-growing hyperscale operators. In Minnesota, GIP completed a $6.2 billion acquisition of ALLETE (parent of Minnesota Power) in December 2025, giving it ownership of both the utility and data centers that consume power from that utility. As one analysis concluded: "When the same entity owns the utility that delivers the power, the batteries that stabilize it, and the data centers that consume it, traditional market checks between independent buyers and sellers cease functioning."

Your community is not dealing with a local energy project. You are dealing with a vertically integrated financial structure where every link feeds money upward to the same institutional shareholders.

The Chain of Incentives

Every step generates fees, credits, and returns for the institutional owners. The BESS qualifies for federal Investment Tax Credits (30–50%). Paired renewable generation qualifies for Production Tax Credits. Stored energy generates Renewable Energy Credits (RECs). The utility earns a regulated rate of return on interconnection infrastructure. The data center receives below-market power through negotiated long-term purchase agreements. And the institutional shareholders earn dividends, capital appreciation, and management fees across every entity in the chain. The community that hosts the BESS gets a modest tax payment, a fire risk, an environmental liability, and the loss of productive farmland.

Political Influence and Regulatory Capture

NextEra Energy spent $7.57 million on federal lobbying in 2022 alone (OpenSecrets). The company's PAC directs contributions based on "location of existing assets or development opportunities" and "leadership or key committee assignments" — meaning money flows toward officials who can approve projects or set energy policy. In Oklahoma, NextEra gave over $830,000 to state lawmakers between 2015 and 2024, including representatives whose districts contain NextEra projects. In Florida, NextEra's parent FPL was implicated in placing ghost candidates on 2020 ballots. In California, NextEra invoked state legislation to override a local battery storage moratorium.

At the institutional level, in May 2025, the FTC and DOJ filed a joint Statement of Interest in a case by Texas AG Ken Paxton alleging BlackRock, State Street, and Vanguard engaged in an anticompetitive conspiracy to manipulate energy markets through coordinated climate coalitions. The FTC stated: "These companies allegedly blocked the production of American coal in the name of climate change scaremongering, all so they could take money out of the pockets of American consumers." Mississippi issued a cease and desist against BlackRock for misleading ESG statements. Montana and 15 state AGs launched an investigation into BlackRock for conflicts of interest. Eleven U.S. senators urged FERC to investigate BlackRock's influence over utility operations.

When your P&Z commission evaluates a BESS proposal, it is evaluating a project backed by entities with the resources to lobby the legislature that wrote the zoning laws, contribute to campaigns of officials who appoint regulators, and influence the utility commission that sets the rates the BESS will be paid. Your volunteer commissioners are facing a proposal shaped by billions of dollars of institutional influence before it reaches their hearing room.

What the Public and Regulators Need to Know

Beneficial ownership disclosure: Require full disclosure of the beneficial ownership chain, including all parent companies, affiliated LLCs, institutional shareholders above 5%, and any shared-ownership relationships with the purchasing utility or end-use customer.

Conflict-of-interest review: Require disclosure of whether any institutional shareholder holding 5% or more of the developer also holds 5% or more of the purchasing utility (Idaho Power/IDACORP), any end-use customer, or any firm involved in the project's lobbying, permitting, or regulatory approval.

Political contribution mapping: Require disclosure of all political contributions — direct, PAC, and 501(c)(4) — made to any official or regulatory body with jurisdiction over this project at the county, state, and federal levels within the past five years.

Subsidy stacking transparency: Require a complete accounting of every federal, state, and local incentive, credit, abatement, or subsidy the project will claim, the estimated dollar value of each, and the entity that will receive each benefit.

Decommissioning and long-term liability: If the project is held by an LLC that can be dissolved, and the parent company's liability is limited, and the institutional shareholders bear no direct liability — who is left holding the bag? Require a decommissioning bond held by an independent third party sufficient to cover full site restoration and environmental remediation, not contingent on the developer's solvency.

Part 9: Grid Conditioning or Dispatchable Solar? The 200 MW Question

When a developer presents a BESS to your community, they will describe it in terms that make it sound like essential grid infrastructure. Understanding what this facility is actually for — and whether its scale matches the stated purpose — is critical to evaluating the proposal honestly.

What Is Power Conditioning?

Power conditioning refers to ancillary grid services that keep the electrical system stable and reliable. These include frequency regulation (keeping grid frequency at exactly 60 Hz), voltage support, ramp-rate smoothing (preventing sudden swings in power output), spinning reserve (standing ready to inject power instantly if a generator trips offline), and peak shaving (reducing demand spikes). These are real services. The grid needs them. Batteries are well-suited to provide them because they can respond within 100–500 milliseconds — far faster than a gas turbine can spool up.

Here is what power conditioning actually requires: frequency regulation is measured in seconds to minutes. A BESS providing frequency response needs to absorb or inject power in short, rapid bursts — not sustained multi-hour discharge cycles. The EIA reported that at the end of 2020, 885 MW of battery capacity nationwide cited frequency response as a use case — spread across hundreds of installations. A single substation-adjacent installation of 5–25 MW can provide meaningful frequency regulation and voltage support for a regional grid segment. Spinning reserve and ramp-rate smoothing similarly require fast response but modest sustained output. These services can be provided by small, distributed BESS installations sited near substations and load centers — exactly where they are needed, on small footprints in industrial or utility corridors.

Power conditioning does not require 200 MW on 120 acres of farmland.

What Does 200 MW on 120 Acres Actually Do?

A 200 MW BESS with a 2-hour or 4-hour duration (200 MW/400 MWh or 200 MW/800 MWh) is not a grid conditioning asset. It is an energy arbitrage and renewable dispatchability asset. Its primary economic function is to charge during periods of cheap surplus generation — typically midday, when solar output peaks and wholesale power prices drop to $15–25/MWh — and discharge during expensive evening peak hours when prices may reach $100–300/MWh or higher. The facility makes money on the spread. It is a financial instrument with a fence around it.

The secondary function is making intermittent renewable generation (solar and wind) dispatchable — meaning the developer or utility can promise to deliver a specified amount of power at a specified time, regardless of whether the sun is shining or the wind is blowing. This is the core value proposition for the utility signing the power purchase agreement: they can count the solar-plus-storage as “firm capacity” for reliability planning. Without the BESS, solar is interruptible. With it, solar becomes a firm resource on paper.

Both of these functions benefit the developer and the utility. Neither of them requires this facility to be located on your farmland. The BESS could be sited at a substation, in an industrial park,

on brownfield land, or adjacent to the generation source it is firming. The reason it is proposed on 120 acres of agricultural land in your county is because your land is cheap, your zoning is permissive, and your community lacks the legal resources to fight back. That is a siting decision driven by cost minimization, not by grid necessity.

The Scale Tells the Story

To put 200 MW in perspective: the NextEra BESS that caught fire in East Hampton, New York was 5 MW. That was a grid conditioning asset — sited at a substation, designed to manage peak load for a constrained area of Long Island. It occupied a small footprint. It served a specific, localized grid function. It still caught fire, closed roads, and halted trains.

The facility proposed for your community is 40 times larger than the one that burned in East Hampton. It is not 40 times more useful for grid conditioning. It is 40 times more profitable for energy arbitrage. The 120-acre footprint is not driven by grid engineering — it is driven by the number of battery containers needed to store enough energy to make the arbitrage math work at scale.

If this facility were truly about grid conditioning and local reliability, the developer could accomplish that with a 10–25 MW installation on 5–10 acres near the nearest utility substation. The fact that they are proposing 200 MW on 120 acres of farmland tells you everything you need to know about the actual purpose. Your community is being asked to host a massive energy trading operation — bearing the fire risk, the environmental risk, the land-use burden, and the emergency response cost — so that a Florida-based corporation can buy electricity cheap and sell it expensive.

The Question to Ask

Demand that the developer provide, in writing, the projected revenue breakdown for this facility: what percentage comes from energy arbitrage (buy low, sell high), what percentage from ancillary grid services (frequency regulation, voltage support, spinning reserve), and what percentage from capacity payments under a power purchase agreement. If the answer is predominantly arbitrage and capacity payments — and it will be — then they are not building infrastructure for your community. They are building a trading desk on your farmland.

Part 10: Why Outdoor Containerized Design? The Fire Containment Architecture

If a developer tells your community their BESS is “safe” because it uses an outdoor, containerized design, understand what that actually means: the entire physical architecture of the facility is built around the assumption that individual containers will catch fire. The outdoor design is not a performance feature — it is a fire containment strategy. The safety plan IS the expectation of fire.

The Moss Landing facility that burned in January 2025 stored its batteries indoors, in a repurposed 1950s-era power plant building. Thousands of NMC battery racks were packed into a single enclosed space with no modern compartmentalization. When thermal runaway began, the indoor configuration allowed intense heat accumulation and limited ventilation. The fire lasted three days, deposited 55,000 pounds of toxic metals across the landscape, and forced the evacuation of 1,500 residents.

The Industry’s Response: Spread the Risk, Not the Fire

After Moss Landing and a string of other fires, the industry shifted to outdoor containerized systems — not because they prevent fire, but because they limit the scope of each fire to a single container rather than an entire building. Each container is a self-contained unit with its own battery modules, cooling, fire suppression, and ventilation. The containers are spaced apart so that if one burns, the theory is that adjacent containers will not ignite.

The insurance industry has been explicit about why this shift occurred. Industry broker councils have stated that the Moss Landing fire reinforced the industry’s decision to move to outdoor, containerized batteries over the past five years. Most underwriters are now hesitant to insure indoor BESS installations at all. Indoor facilities using NMC chemistry face significantly higher scrutiny, and some insurers will not cover them. The shift to outdoor containers was driven as much by insurability as by safety engineering.

Outdoor Containers Still Catch Fire

The containerized design limits cascading failure — in theory. In practice, outdoor containerized facilities have still experienced significant fire events. The Otay Mesa Gateway facility in San Diego County (250 MW, containerized, LS Power) caught fire in May 2024. Firefighters maintained a 600-foot safety barrier for over 22 hours. Air monitors showed dangerous hydrogen levels. Batteries reignited on successive nights. The fire was not declared fully extinguished until May 31 — over two weeks after it started. A state prison was sheltered in place. The Warwick, New York site has experienced three separate fire incidents across 2023 and 2025, all at containerized outdoor facilities. Rainwater intrusion into battery containers was cited as a contributing factor in at least one incident.

The key question for your community: if the entire safety architecture of this facility is designed around the assumption that containers will catch fire, and the goal is to limit fire to one container at a time — is that really “safe”? Or is it a more manageable version of dangerous, sited on your land, next to your homes, with your fire department expected to manage the response?

Part 11: Manufacturing and Supply Chain — Where Are These Batteries Made?

When a developer says their BESS uses "American technology," it is worth asking exactly what that means. The global supply chain for lithium-ion battery cells — including the LFP cells marketed as "iron-based" — is overwhelmingly dominated by China and South Korea. Until very recently, virtually no LFP battery cells were manufactured in the United States.

The Current State of U.S. LFP Cell Manufacturing

As of mid-2025, the first large-scale LFP cell manufacturing facility in the United States began production: LG Energy Solution's plant in Holland, Michigan. This $1.4 billion facility, which started production in May 2025, is the first to produce LFP battery cells at commercial scale on American soil, with an annual capacity of 16.5 GWh. Prior to this, American battery customers had to source all LFP cells from China.

Other facilities are coming online or announced, but the landscape remains thin. Envision AESC retooled a legacy EV battery plant in Smyrna, Tennessee to produce LFP cells for the BESS market (primarily for Fluence Energy). Hithium operates a 10 GWh LFP battery assembly plant in Texas, but it assembles from imported cells — it does not manufacture the cells domestically. Canadian Solar subsidiary e-STORAGE is building a 3 GWh LFP cell and module plant in Kentucky, but as of mid-2025 it was not yet complete. American Battery Factory, a Utah-based startup, has announced plans for a network of LFP gigafactories but has not yet reached commercial-scale production.

The Raw Material Problem

Even where cells are manufactured in the U.S., the raw materials tell a different story. LFP cathode active material (CAM) — the core chemistry of the battery — is still sourced overwhelmingly from China, South Korea, and Indonesia. A 2025 analysis found that U.S.-made LFP cell prices are approximately 56% higher than Chinese equivalents, in large part because American plants depend on imported cathode material subject to tariffs of 25–32%. Chinese manufacturers often sell at or below production cost, subsidized by state entities.

The lithium itself is largely mined in Australia, Chile, and Argentina, then processed in China. The graphite used in anodes is predominantly processed in China. Iron and phosphate (the "iron" in LFP) are more widely available, but the specialized cathode powder manufacturing remains concentrated in Asia. Several U.S. companies (ICL Group in Missouri, 6K Energy, Nano One in Canada) are developing domestic cathode production, but none have reached the scale needed to supply a significant portion of the U.S. BESS market.

System Integration: Cells Are Not the Whole Story

A BESS is not just battery cells. Each containerized unit includes battery modules (assembled from cells), a Battery Management System (BMS), power conversion systems (inverters), thermal management (liquid cooling or HVAC), fire suppression systems, and supervisory control software. The cells may be manufactured in one country, assembled into modules in another, integrated into containers in a third, and the control software developed in a fourth.

Major system integrators include Fluence (a Siemens/AES joint venture), Tesla (Megapack), BYD (China), CATL (China), Samsung SDI (South Korea), and Sungrow (China).

When a developer tells your community their system is “American-made” or uses “domestic technology,” demand specificity: Where were the cells manufactured? Where was the cathode material processed? Where were the modules assembled? Where was the BMS and control software developed? Who manufactured the fire suppression system? The answer, in most cases, will trace back to China or South Korea for the most critical components.

NextEra Energy Does Not Manufacture Batteries

This point cannot be overstated: NextEra Energy does not manufacture a single battery cell, a single module, a single container, or a single component of any BESS they deploy. They do not make anything. NextEra is a project developer and asset operator. They select the site, hire engineers, manage construction, sign power purchase agreements, collect federal tax credits, and operate the result. The hardware comes entirely from third-party manufacturers.

NextEra’s primary battery supplier is Samsung SDI, a South Korean conglomerate and the world’s sixth-largest EV cell maker. In March 2025, Samsung SDI confirmed a multi-project energy storage supply deal with NextEra worth approximately $726 million (1 trillion Korean won) for 6.3 gigawatt-hours of ESS batteries — roughly 11.5% of total ESS capacity in North America last year. The product being supplied is the Samsung Battery Box (SBB) 1.5 model, which uses high-nickel NCA (nickel-cobalt-aluminum) cells and modules stacked on racks inside 20-foot shipping containers. Each SBB 1.5 unit stores 5.26 MWh of energy.

■MFG ■OPS The chemistry is significant: NCA is a high-nickel chemistry in the same family as the NMC cells that burned at Moss Landing. It is not LFP. If NextEra is representing to your community that their system is “iron-based” or uses the “safer” chemistry, demand that they identify the exact product model and chemistry that will be deployed at your site. Samsung SDI’s newer SBB 1.7 also uses NCA cells, while their SBB 2.0 uses LFP — but the SBB 2.0 was not scheduled for U.S. mass production until Q4 2026. The question is: which model is being proposed for your community, and is it the same chemistry the developer is describing in public meetings?

Samsung SDI’s batteries for NextEra are currently manufactured in South Korea, with U.S. production of NCA ESS cells beginning in late 2025 at the StarPlus Energy factory in Indiana (a joint venture with Stellantis). LFP production lines at that facility are not expected to be operational until late 2026. Before that, every Samsung SDI battery deployed by NextEra was manufactured overseas and shipped to the project site.

NextEra has also been identified as having “its own system integration capabilities” in industry rankings — meaning they may assemble or configure containerized units from supplied components, rather than purchasing fully integrated containers. This raises additional questions about quality control, warranty responsibility, and the chain of accountability if something fails. When the cell manufacturer is Samsung SDI in South Korea, the container integrator may be NextEra or a subcontractor, the fire suppression system comes from yet another vendor, and the BMS software from another — who is responsible when a container catches fire?

Why This Matters to Your Community

This is not an argument against foreign manufacturing per se. It is an argument for transparency. If a developer is collecting federal tax credits and Investment Tax Credits funded by American taxpayers, siting a facility on American farmland, and asking an American community to bear the fire risk, the environmental risk, and the emergency response burden — that community has a right to know exactly where every component of that system was made, by whom, under what quality standards, and with what warranty protections. The community also has a right to know whether the developer chose components based on safety and quality, or based on the lowest bid from a global supply chain optimized for cost.

Part 12: The BMS Black Box — Controls, Cybersecurity, and Single Points of Failure

The Battery Management System (BMS) is the brain of every BESS container. It monitors cell voltage, temperature, current flow, and state of charge (SoC) for every module. It controls charging and discharging rates, manages thermal cooling, triggers fire suppression, and communicates with the site-level Energy Management System (EMS) and the utility's SCADA grid controls. If the BMS works, the system operates within safe parameters. If the BMS fails, lies, or is compromised, thermal runaway can begin before anyone knows something is wrong. The BMS is the single most critical safety system in a BESS — and it is the one component communities almost never ask about.

BMS Architecture and Components

A modern BESS BMS typically includes: Cell Monitoring Units (CMU) that measure voltage and temperature at the individual cell level; a Battery Management Unit (BMU) that aggregates CMU data and executes protection logic; a Battery Control Unit (BCU) that manages charge/discharge commands, cooling system activation, and fire suppression triggers; and a communications layer that connects the BMS to the site-level EMS and, in many cases, to cloud-based monitoring platforms via internet connection. These components communicate internally via CAN bus (Controller Area Network) and externally via Modbus TCP/RTU, OPC UA, or proprietary APIs over Ethernet or cellular connections.

Most commercial BMS platforms are proprietary. The firmware — the core software that makes safety decisions — is written by the battery manufacturer or a third-party integrator and is typically not available for independent audit. The algorithms that determine when to trigger a cooling response, when to disconnect a module, when to activate fire suppression, and when to send an alarm are trade secrets. Your community is being asked to trust that software it cannot inspect, written by engineers it will never meet, running on hardware manufactured overseas, to protect your homes and farmland from a chemical fire.

BMS Failure Modes

The EPRI/PNNL joint study found that balance-of-system components and controls were the leading cause of BESS failures — not the battery cells themselves. Only 11% of incidents were attributed to cell or module failures; the majority were caused by operational and integration factors, many of which involve the BMS and its associated systems. Specific BMS failure modes include:

■BMS ■MFG Sensor failure or drift: Voltage or temperature sensors that provide inaccurate readings, causing the BMS to allow operation outside safe parameters. A sensor reading 25°C when the actual temperature is 60°C will not trigger cooling or shutdown. The system does not know it is overheating.

■BMS Firmware bugs: Software errors in the protection logic that fail to trigger shutdowns, manage charge/discharge limits incorrectly, or misinterpret cell state. Firmware bugs may not

manifest until a specific set of conditions occurs — a combination of temperature, load, and SoC that was never tested during commissioning.

■BMS ■CYB Communication failure: Loss of data link between CMUs and the BMU, between the BMS and the EMS, or between the site and the remote monitoring center. If the BMS cannot communicate an alarm, nobody knows there is a problem. If the BMS cannot receive commands from the EMS, it cannot respond to grid conditions.

■BMS ■DES Cooling system integration failure: The BMS monitors temperature and activates cooling. If the interface between the BMS and the HVAC/liquid cooling system fails — a wiring fault, a relay failure, a software handshake error — the BMS may believe cooling is active when it is not. This is the condition that leads to thermal runaway in the absence of any cell defect.

■SUP ■BMS Fire suppression integration failure: The BMS triggers fire suppression based on temperature and gas detection thresholds. If the interface fails, suppression does not activate. The Moss Landing investigation found that a fire suppression system in one of the battery racks had failed, allowing fire to spread.

■BMS ■DES Power loss to the BMS itself: If the BMS loses its own power supply — from a transformer failure, a fuse, a wiring fault, or a grid outage with failed backup — it goes dark. The batteries do not stop containing energy when the BMS stops monitoring them. An unmonitored lithium-ion battery is an uncontrolled lithium-ion battery.

Cybersecurity: The Invisible Attack Surface

Modern BESS installations are networked systems. The BMS communicates with the EMS. The EMS communicates with the utility's SCADA system. The site communicates with cloud-based monitoring platforms maintained by the manufacturer or a third-party vendor, often located overseas. Firmware updates are delivered remotely. Diagnostic sessions are conducted remotely. Operational data is transmitted continuously over broadband, cellular, or satellite links.

■CYB ■BMS Each of these connections is an attack surface. Cybersecurity researchers have identified multiple threat vectors specific to BESS, including: false data injection (spoofing sensor readings to disable safety logic or trigger incorrect charging); firmware tampering (unauthorized modification of BMS protection algorithms); man-in-the-middle attacks (intercepting and altering commands between BMS and EMS); denial-of-service attacks (overwhelming the BMS network to prevent alarm transmission); and ransomware (locking the BMS and demanding payment to restore safety monitoring). Successful attacks can manipulate BMS algorithms, control signals, or sensing data, which can lead to battery degradation, damage, or fire.

■CYB ■MFG The supply chain risk is particularly acute. China dominates the global BESS market, producing a significant share of lithium-ion batteries, power conversion systems, and BMS components. Industry cybersecurity experts have raised concerns about the possibility of embedded vulnerabilities — hidden backdoors, malicious firmware, or unauthorized remote access mechanisms — pre-installed in BESS components that could enable future exploitation to disable, disrupt, or manipulate energy storage operations. A T&D World analysis noted that

battery monitoring systems, inverter systems, and fire detection and suppression systems often have no cybersecurity or authentication, and that many BESS cases attributed to “unknown root causes” in the EPRI database may have been control-system cyber-related.

Communications Failover and Broadband Dependency

Most utility-scale BESS rely on broadband internet or dedicated fiber for communication between the site BMS, the remote monitoring center, and the utility’s control systems. In rural locations — like 120 acres of farmland — broadband may be delivered via fixed wireless, cellular, or satellite, all of which are subject to weather disruption, tower outages, and capacity limitations. If the primary communication link fails:

Can the BMS operate safely in standalone mode? For how long? What degraded functionality results? If the BMS requires cloud connectivity to execute firmware-level safety decisions, a communication outage is a safety event, not just an inconvenience. What is the communications failover path? Is there a redundant link (cellular backup to fiber, satellite backup to cellular)? What is the failover time? Has the failover been tested under load conditions? Who is notified when communication is lost? Is there a local alarm at the site, or does notification depend on the same communication link that just failed?

Single Points of Failure

Every BESS has single points of failure that, if they occur, dramatically increase risk. Communities should demand identification of every one. Key single points of failure include: the BMS power supply (if it fails, all monitoring stops); the communications link to the remote monitoring center (if it fails, nobody off-site knows there is a problem); the cooling system pump or compressor (if it fails, temperatures rise unchecked); the fire suppression trigger relay (if it fails, suppression does not activate); the main site transformer (if it fails, the BESS cannot discharge safely and may not be able to power its own cooling); and the firmware itself (if it contains a bug in the thermal protection logic, the entire safety model is compromised). Each of these should have a redundant backup. Demand that the developer identify, in writing, every single point of failure and the specific redundancy or failover mechanism for each.

Maintenance Logs, Firmware, and Auditability

BMS firmware is updated periodically by the manufacturer — sometimes remotely, without on-site personnel present. Each firmware update changes the behavior of the safety system. A firmware update that modifies temperature thresholds, charge rate limits, or alarm trigger points can change the risk profile of the entire facility. Communities should demand: that all firmware versions and update logs be maintained and available for inspection by county officials and independent auditors; that no firmware update be applied without prior written notice to the county; that all maintenance records, inspection reports, BMS diagnostic logs, and alarm histories be stored in a format accessible to county officials, not locked inside a proprietary vendor portal; and that the county have the right to commission an independent third-party cybersecurity audit of the BMS and communications infrastructure at the developer’s expense, at any time during the life of the project.

Part 13: Questions Your Community Must Ask

The following questions should be submitted in writing to the developer, the planning and zoning commission, and the county commissioners. Demand written answers. Record all public meetings.

A. Battery Chemistry and Technology

1. What specific battery chemistry will be used (NMC, LFP, or other)? Provide the manufacturer name, model number, and cell-level specification sheet.

2. What is the UL 9540A test report for the proposed battery system? Has it been tested at the installation level, not just the cell level?

3. What is the flammable electrolyte composition? What gases are produced during thermal runaway, and in what concentrations?

4. What is the expected cycle life of the batteries? What is the degradation curve? At what point will they be replaced, and who pays for replacement?

5. Are you using the same battery chemistry and system design that was involved in the NextEra East Hampton fire in May 2023? If not, what specifically is different?

6. Has the proposed battery system (not just the chemistry, but the specific integrated system with its BMS, cooling, and enclosure) ever experienced a thermal runaway event at any installation worldwide?

B. Fire Safety and Emergency Response

7. What is the developer's thermal runaway propagation prevention strategy? How is cell-to-cell, module-to-module, and container-to-container propagation prevented?

8. What fire suppression system is installed? Water-based, clean agent, or other? What is the system's rated capacity and response time?

9. What is the expected burn duration if a full container undergoes thermal runaway? What about cascading failure across multiple containers?

10. What toxic gases and particulates will be released in a fire event? What are the modeled dispersion plumes at various wind speeds and directions? Provide specific modeling results.

11. Has the developer provided a complete Hazard Mitigation Analysis (HMA) as required by NFPA 855 and the International Fire Code for systems exceeding 600 kWh?

12. What specific fire response training has been provided to the local fire department? Who conducted it? How many hours? Is it recurring and funded by the developer?

13. What specialized equipment (PPE, air monitoring, thermal imaging, foam/suppression agents) has been provided to the local fire department? Who pays for maintenance and replacement?

14. What is the estimated cost to the county for emergency response to a multi-day BESS fire? Will the developer reimburse all costs, including mutual aid from neighboring jurisdictions?

15. What are the proposed setback distances from the nearest residence, school, waterway, and agricultural operation? How do these compare to NFPA 855 recommendations?

C. Environmental Protection

16. What is the stormwater management plan? How will electrolyte leakage or fire suppression runoff be contained and prevented from reaching waterways and groundwater?

17. What baseline soil and water testing has been conducted? Will the developer commit to independent, third-party environmental monitoring at regular intervals throughout the life of the project and for 10 years after decommissioning?

18. What is the plan for managing end-of-life batteries? Who bears the cost and liability for recycling or disposal? Where will spent batteries be transported?

19. Has a complete Environmental Impact Assessment been conducted and made available for public review before any permits are issued?

20. What is the noise level at the property boundary from inverters, transformers, and cooling systems? What are the noise levels at the nearest residence, day and night?

D. Financial Structure, Cost Recovery, and Community Benefit

21. What federal tax credits (ITC, PTC) and Renewable Energy Credits (RECs) will the developer claim? What is the total estimated subsidy value over the project lifetime?

22. What is the projected annual tax revenue to the county? How does this compare to the current agricultural tax revenue from the same acreage?

23. Who is the off-taker for the stored energy? Is the purchasing utility affiliated with, owned by, or under contract with NextEra or its subsidiaries?

24. How many permanent local jobs will the facility create? (Not construction jobs — permanent, ongoing operational positions filled by county residents.)

25. What is the total capital cost of the project? What is the expected return on investment, and over what period?

26. What happens to the site if the project is abandoned, the developer goes bankrupt, or the LLCs holding the project are dissolved? Is there a decommissioning bond, and if so, what is its value and who holds it?

27. What is the developer's insurance coverage for environmental contamination, property damage, personal injury, and crop loss resulting from a fire or chemical release?

E. Planning, Zoning, and Public Process

28. What is the current zoning classification of the project site? Is the developer seeking a rezone, a conditional use permit, or a variance? Under what specific statutory authority?

29. When was the public comment period opened, and for how long? Was notice provided to all property owners within one mile of the proposed site?

30. Has the developer complied with all requirements of the Idaho Local Land Use Planning Act (Idaho Code §§ 67-6501 through 67-6537), including comprehensive plan consistency and required findings of fact?

31. Were all permits, contracts, and land-use agreements finalized or executed before, during, or after the public comment period?

32. Has the developer entered into any agreements, donations, or in-kind contributions with any county official, employee, board member, or their immediate family members?

F. Manufacturing, Supply Chain, and Developer Accountability

33. Where were the battery cells manufactured? Provide the factory name, location, and country of origin.

34. Where was the cathode active material (CAM) processed? Is any component of the battery subject to tariffs or sourced from a Foreign Entity of Concern (FEOC) under IRA/OBBBA rules?

35. Who manufactured and integrated the complete containerized BESS unit (cells, BMS, cooling, fire suppression, enclosure)? Is it a single manufacturer or multiple vendors?

36. What quality control and inspection standards were applied during cell manufacturing and system integration? Provide UL, IEC, or equivalent certification documentation.

37. What warranty does the cell manufacturer provide? What warranty does the system integrator provide? Are these warranties backed by a U.S. entity with attachable assets, or by a foreign parent company?

38. Does NextEra manufacture any component of this BESS — cells, modules, containers, BMS, fire suppression, cooling systems, or control software? If not, identify every manufacturer and supplier in the chain of custody from raw material to installed container.

39. What specific Samsung SDI product model is being deployed at this site? Is it the SBB 1.5 (NCA chemistry), the SBB 1.7 (NCA), or the SBB 2.0 (LFP)? Provide the product specification sheet.

40. If the chemistry being deployed is NCA (nickel-cobalt-aluminum), has NextEra or any representative described this system to this community or its officials as “iron-based,” “LFP,” or otherwise implied it uses a safer chemistry than what is actually being installed?

41. Who bears legal liability in the event of a fire caused by a manufacturing defect in the battery cells, a failure in the BMS, a malfunction in the fire suppression system, or a cooling system leak? Is it the cell manufacturer (Samsung SDI), the system integrator, or NextEra? Provide the contractual chain of indemnification.

42. Has the specific Samsung SDI SBB model being deployed at this site ever experienced a thermal runaway event, fire, or failure at any installation worldwide? If so, provide incident details.

G. BMS, Cybersecurity, Communications, and Auditability

43. Who manufactured the Battery Management System (BMS) hardware and firmware? Is the BMS proprietary or open-standard? Can the firmware source code or compiled logic be independently audited?

44. Where are BMS maintenance logs, firmware version histories, alarm records, diagnostic reports, and inspection data stored? Are they stored on-site, in a cloud platform, or at the manufacturer's facility? Can county officials access these records on demand?

45. How are firmware updates delivered to the BMS — remotely over broadband, via on-site USB, or other method? Will the developer provide written notice to the county before any firmware update is applied? Will a changelog of each update be maintained and accessible?

46. What is the primary communications link between the site and the remote monitoring center? What is the failover path if the primary link fails (cellular, satellite, other)? What is the failover time? Has it been tested under operational load?

47. Can the BMS operate safely in standalone mode if all external communications are lost? For how long? What safety functions are degraded or lost in standalone mode?

48. What cybersecurity protections are in place on the BMS, EMS, and site communications infrastructure? Specifically: Is the BMS network segmented from public networks? Are firmware integrity checks (secure boot) implemented? Is remote access authenticated with multi-factor authentication? Is data encrypted in transit and at rest?

49. Has a cybersecurity vulnerability assessment or penetration test been conducted on the specific BMS and communications infrastructure to be deployed at this site? If so, provide the results. If not, will the developer fund an independent assessment before the facility goes operational?

50. What are the identified single points of failure in this system (BMS power supply, communications link, cooling pump/compressor, fire suppression trigger, transformer, firmware)? For each, what is the specific redundancy or failover mechanism?

51. What happens if the BMS loses its own power supply? Do the batteries continue to operate unmonitored? For how long? What automatic protections exist in the absence of BMS monitoring?

52. Are any BMS components, communications modules, or control system elements manufactured by entities that could be classified as Foreign Entities of Concern? Has any component of the control system been evaluated for embedded vulnerabilities, backdoors, or unauthorized remote access capability?

53. Will the developer grant the county the right to commission an independent third-party cybersecurity and controls audit of the BMS and communications infrastructure, at the developer's expense, at any time during the life of the project?

H. Maintenance and Operations

54. What is the ongoing maintenance schedule? Who performs it — local contractors or out-of-state crews?

55. What is the BMS monitoring protocol? Is it monitored 24/7? By whom? Where is the monitoring center located?

56. What is the protocol for detecting and responding to off-gassing, elevated cell temperatures, or cooling system failures outside business hours?

57. How often are fire suppression systems tested and inspected? By whom? Are inspection reports made available to the county?

58. What is the warranty period on the battery modules, inverters, and fire suppression systems? What happens when the warranty expires?

59. What is the expected operational life of the facility? What are the developer's contractual obligations at end-of-life?

I. The Big Question

60. If this system is as safe as you say, will the developer agree in writing to accept full, uncapped financial liability for all damages — including environmental remediation, property value diminishment, crop loss, livestock contamination, and personal injury — arising from any fire, chemical release, or operational failure at this facility, for the life of the project and 20 years after decommissioning? If not, why not?

Appendix: Sources, References, and Resources

Incident Databases

EPRI BESS Failure Incident Database — storagewiki.epri.com/index.php/BESS_Failure_Incident_Database — The most comprehensive public database of utility and commercial BESS failure events worldwide, maintained by the Electric Power Research Institute. Documented 81+ incidents through 2024.

UL Lithium-Ion Battery Incident Reporting Database — Maintained by UL Solutions. Tracks battery incidents across applications.

BESS SDK Incident Map — bess-sdk.com/tools/incidents — Interactive global map of BESS failure incidents sourced from EPRI data.

Fire Safety Standards and Guidance

NFPA 855: Standard for the Installation of Stationary Energy Storage Systems — nfpa.org — The primary U.S. fire safety standard for BESS installations. Requires hazard mitigation analysis (HMA) for systems exceeding 600 kWh.

UL 9540A: Test Method for Evaluating Thermal Runaway Fire Propagation in BESS — Mandatory testing standard that evaluates whether thermal runaway propagates from cell to module to installation level.

International Fire Code (IFC), Chapter 12 — Electric Energy Storage Systems provisions.

IAFF/UL FSRI: Lithium-Ion Battery ESS Explosion Report — fsri.org — Detailed investigation of the 2019 McMicken (Arizona) explosion, including first responder safety analysis.

USFA/FEMA: Emerging Hazards of BESS Fires — fema.gov — Federal recognition that BESS fires represent an emerging hazard that most local departments are not equipped to handle.

Moss Landing Fire (January 2025)

Aiello et al., “Coastal wetland deposition of cathode metals from the world’s largest lithium-ion battery fire,” Scientific Reports (2025) — nature.com/articles/s41598-025-25972-8 — Peer-reviewed study documenting 55,000 lbs of toxic metal deposition in Elkhorn Slough wetlands.

Inside Climate News, “Moss Landing Battery Fire Leads to Health Fears, Evidence of Contamination” (Feb 2025) — insideclimatenews.org

Mercury News, “New study: Moss Landing battery fire dumped 55,000 pounds of toxic metals” (Dec 2025) — mercurynews.com

MIT Technology Review, “What a major battery fire means for the future of energy storage” (Feb 2025) — technologyreview.com

Monterey County FAQs: Moss Landing Power Plant Fire — readymontereycounty.org — Official county resource on environmental testing and community guidance.

HAZMAT Management Magazine, “The Moss Landing Fallout: Rethinking Hazmat Protocols for the Gigawatt Era” (Feb 2026) — hazmatmag.com

NextEra Energy Incidents and Community Opposition

East Hampton Star, “Roads Closed, Trains Halted Over Smoldering Battery” (May 2023) and “Eyeing 2024 for Return of Battery Facility” (Nov 2023) — easthamptonstar.com — Coverage of NextEra’s East Hampton BESS fire.

Canary Media, “New York is reeling from its hot battery summer” (Aug 2023) — canarymedia.com — Coverage of the three 2023 NY BESS fires.

KAKE News, “Sumner County rejects proposed battery storage facility” (Dec 2025) — kake.com — Sumner County, KS rejection of NextEra BESS.

Investigate Midwest, “Why Oklahoma farmers are leery of the energy storage facility next door” (Mar 2025) — investigatemidwest.org — Coverage of Garfield County, OK lawsuit against NextEra.

Platte County Record-Times, “Packed town hall highlights concerns on NextEra’s proposed wind, solar and BESS project” (Jul 2025) — pcrecordtimes.com — Chugwater, WY community opposition.

Guernsey Gazette, “Energy developer faces scrutiny over transparency, legal cases” (Jul 2025) — guernseygazette.com — NextEra legal history including Massachusetts lawsuit and Florida “ghost candidates.”

Battery Chemistry and LFP Safety Research

pv magazine, “How safe are lithium iron phosphate batteries?” (Apr 2024) — pv-magazine.com — Coverage of University of Sheffield / Imperial College London meta-analysis finding LFP off-gas more flammable than NMC in enclosed volumes.

Navigating battery choices: A comparative study of LFP and NMC battery technologies — ScienceDirect (2024) — Comprehensive technical comparison of LFP and NMC chemistries.

Form Energy — formenergy.com/technology/battery-technology — Iron-air battery technology overview.

Industry Analysis and Failure Root Cause

EPRI/PNNL/TWAICE, “Insights from EPRI’s BESS Failure Incident Database: Analysis of Failure Root Cause” (2024) — First publicly available root cause analysis of BESS failures. Found 65% of incidents linked to operational/integration factors, only 11% to cell failures.

DNV GL, McMicken BESS Failure Investigation Report (Jul 2020) — Root cause analysis of the 2019 Arizona explosion.

Battery Design, “Failures and Fires in BESS Systems” (Apr 2025) — batterydesign.net — Analysis of failure modes including rain intrusion, humidity control, and commissioning errors.

Brown & Brown Insurance, “Beyond the Headlines: The BESS Insurance Market After Moss Landing” (Jun 2025) — bbrown.com — Insurance industry perspective on indoor vs. outdoor BESS risk.

Marsh, “Battery Energy Storage Systems and the rising risk of thermal runaway” — marsh.com — Insurance industry analysis of BESS fire risk.

Stop Seguro, “The Hidden Risk Behind Growing Battery Storage Capacity” (Jan 2025) — stopseguro.org — Independent analysis challenging EPRI’s failure rate methodology.

Cybersecurity

T&D World, “How Vulnerable to Cyber Attacks are Battery Energy Storage Systems?” — tdworld.com — Analysis of BESS control system cyber vulnerabilities and the likelihood that many “unknown cause” incidents were cyber-related.

Industrial Cyber, “BESS cyber physical risk” (Feb 2025) — industrialcyber.co — Detailed analysis of BMS attack surfaces, supply chain backdoor risks, and remote access vulnerabilities.

Energy Institute, “Cybersecurity and BESS” — knowledge.energyinst.org — Overview of BESS cybersecurity threats including compromised BMS causing thermal runaway.

MDPI Batteries Journal, “Cyber-Physical Cloud Battery Management Systems: Review of Security Aspects” (2023) — Peer-reviewed academic survey of BMS cybersecurity vulnerabilities.

Sandia National Laboratory, “Cybersecurity of Battery Energy Storage Systems” — osti.gov — U.S. DOE laboratory assessment of BESS cybersecurity risks.

Manufacturing and Supply Chain

Samsung SDI / KED Global, “Samsung SDI to ink $726M ESS deal with NextEra Energy” (Jul 2024) — kedglobal.com — Documentation of NextEra’s primary battery supply relationship and NCA chemistry.

Canary Media, “LG opens massive Michigan factory to make LFP batteries for the grid” (Jun 2025) — canarymedia.com — First large-scale U.S. LFP cell manufacturing.

Benchmark Minerals, “Benchmark debuts cell price forecast as US’ LFP pipeline surges” (Jul 2025) — source.benchmarkminerals.com — Analysis showing U.S. LFP cells 56% more expensive than Chinese equivalents.

Solar Power World, “Almost overnight, the US is on way to having an oversupply of ESS battery cells” (Jan 2026) — solarpowerworldonline.com — U.S. ESS manufacturing landscape.

Idaho-Specific Legal Authority

Idaho Local Land Use Planning Act — Idaho Code §§ 67-6501 through 67-6537 — The governing state statute for land use planning, zoning, and permitting in Idaho counties.

Idaho Code § 67-6508: Planning Duties — Comprehensive plan requirements.

Idaho Code § 67-6509: Zoning Commission — Powers and procedures.

Idaho Code § 67-6512: Permits — Conditional use permit requirements and process.

Idaho Code § 67-6521: Actions by Affected Persons — Legal standing for citizens to challenge land use decisions.

Corporate Ownership, Institutional Influence, and Regulatory Capture

FTC/DOJ Statement of Interest in Texas v. BlackRock, State Street, Vanguard (May 2025) — ftc.gov — Federal antitrust enforcers supporting allegations of anticompetitive conspiracy to manipulate energy markets.

Texas Attorney General, "Paxton Sues BlackRock, State Street, and Vanguard for Illegally Conspiring to Manipulate Energy Markets" — texasattorneygeneral.gov

Montana AG / 16-State Attorney General Investigation into BlackRock ESG Conflicts of Interest (Mar 2024) — dojmt.gov

Mississippi Secretary of State Cease and Desist Order Against BlackRock (Mar 2024) — sos.ms.gov

Senator Mike Lee et al., Letter to FERC Urging Investigation of BlackRock's Influence Over Utility Operations (Jun 2023) — lee.senate.gov

The Open Record, "What Happens When Your Utility Company Owns the Data Center Using All the Power?" (Feb 2026) — theopenrecord.org — Analysis of BlackRock GIP vertical integration across utilities, BESS, and data centers.

The Hillsboro Herald, "BlackRock's Power Play: How Wall Street, AI, and Data Centers Are Driving Up Oregon's Electric Bills" (Oct 2025) — hillsboroherald.com — Documenting BlackRock ownership of Jupiter Power BESS, Portland General Electric equity, and Aligned Data Centers.

Private Equity Stakeholder Project, "From Power Plants to Processors" (Nov 2025) — pestakeholder.org — Report on private equity acquisitions across the AI/energy supply chain.

PBS/AP, "Private equity pursues profits in power utilities as data centers drive energy demand" (Sep 2025) — pbswisconsin.org

Fintel.io: IDACORP Institutional Ownership — fintel.io/so/us/ida — BlackRock as largest IDACORP/Idaho Power shareholder at ~12%.

WallStreetZen: IDACORP Ownership — wallstreetzen.com/stocks/us/nyse/ida/ownership — Institutional ownership data.

OpenSecrets: NextEra Energy Lobbying Profile — opensecrets.org/federal-lobbying/clients/summary?id=D000000321 — Federal lobbying expenditures.

OpenSecrets: NextEra Energy PAC — opensecrets.org/political-action-committees-pacs/nextera-energy/C00064774 — PAC contributions to federal candidates.

FollowTheMoney.org: NextEra Energy — followthemoney.org/entity-details?eid=1039 — State-level political contributions.

BlackRock Vanguard Watch — blackrockvanguardwatch.com — Visual overview of Vanguard/BlackRock cross-ownership across S&P 500.

Document Revision History

Revision	Date	Author	Description of Changes
1.0	03/25/2026	Jeff Pierson	Initial draft. Song lyrics (“That’s a BESS Too Far”) and preliminary BESS issue brief including project overview, fire risk summary, and Moss Landing case study.
2.0	03/25/2026	Jeff Pierson	Expanded to full technology briefing. Added: battery chemistry deep-dive (NMC vs. LFP vs. iron-air) with comparison table; Sheffield/Imperial College LFP off-gas flammability research; documented fire incidents table (11 incidents, 2019–2025); NextEra corporate track record across 7 states; environmental and agricultural concerns; vertical integration and subsidy analysis; 39 community questions across 7 categories.
3.0	03/25/2026	Jeff Pierson	Added Part 9: Outdoor containerized design as fire containment architecture (insurance industry shift, Otay Mesa and Warwick case studies, the “manageable dangerous” argument). Added Part 10: Manufacturing and supply chain analysis (U.S. LFP cell production status, LG Holland MI plant, cathode material sourcing from China/South Korea/Indonesia, 56% price premium for domestic cells, raw material tracing requirements). Added question category F (manufacturing/supply chain, questions 33–37). Total questions expanded to 44 across 8 categories.
4.0	03/25/2026	Jeff Pierson	Added Part 8: Grid conditioning vs. dispatchable solar analysis. Explained what power conditioning actually requires (5–25 MW near substations, fast-response short bursts) vs. what 200 MW on 120 acres is designed for (energy arbitrage, renewable dispatchability, capacity payments). Analyzed the 200 MW / 120-acre footprint as evidence of financial purpose, not grid necessity. Added comparison to NextEra’s 5 MW East Hampton facility. Renumbered Parts 9–11.
5.0	03/25/2026	Jeff Pierson	Added to Part 10: NextEra as middleman analysis — NextEra manufactures zero components; documented Samsung SDI $726M supply deal for NCA-chemistry SBB 1.5 containers; identified discrepancy between NCA chemistry being supplied and potential “iron-based”/LFP representations to communities; documented Samsung SDI manufacturing timeline (Korea now, Indiana NCA late 2025, LFP not until Q4 2026); raised chain-of-liability question across cell manufacturer, integrator, and developer. Expanded Question Section F to 10 questions (33–42) targeting specific Samsung SDI product models, chemistry verification, and indemnification chain.
6.0	03/25/2026	Jeff Pierson	Added Part 11: BMS Black Box — Controls, Cybersecurity, and Single Points of Failure. Added Question Section G with 11 BMS/cybersecurity questions (43–53). Total questions now 60 across 9 categories. Renumbered to Part 12.

7.0	03/25/2026	Jeff Pierson	Added risk category indicators with color-coded legend. Tagged fire incidents, BMS failure modes, cybersecurity, and root-cause paragraphs. Added Sources, References, and Resources appendix (9 categories).
8.0	03/25/2026	Jeff Pierson	Added Part 8: Corporate Ownership, Chain of Incentives, and Regulatory Capture. Documented BlackRock/Vanguard/State Street cross-ownership of NextEra (~22%) and IDACORP/Idaho Power (BlackRock 12.05%). Mapped vertical stack ownership. Cited FTC/DOJ antitrust statement vs. BlackRock/State Street/Vanguard, Texas AG lawsuit, Mississippi cease-and-desist, 16-state AG investigation, 11 senators urging FERC probe. Documented NextEra $7.57M federal lobbying, Florida ghost candidates, Oklahoma $830K contributions. Added five transparency demands. Renumbered to 13 parts.

This brief is intended for public education and civic advocacy purposes. It does not constitute legal advice. For legal guidance specific to your jurisdiction, consult a licensed attorney familiar with Idaho's Local Land Use Planning Act (Idaho Code §§ 67-6501–67-6537).

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